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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/845,897	04/28/1997	M. ASHRAF IMAM	77897-US1	8846
26384 7590 03/21/2007 NAVAL RESEARCH LABORATORY ASSOCIATE COUNSEL (PATENTS) CODE 1008.2 4555 OVERLOOK AVENUE, S.W. WASHINGTON, DC 20375-5320			EXAMINER VO, HAI	
			ART UNIT 1771	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/21/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

08/845,897

Applicant(s)

IMAM ET AL.

Examiner

Hai Vo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 5, 6, 8-10 and 12-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 11 and 17-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 01/17/2007
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

1. The art rejections over JP 08-245810 in view of Tsang et al (US 4,605,595) have been withdrawn in view of the declaration filed on 07/13/2006. The declaration is sufficient to antedate the reference.
2. The art rejections over Tsang in view of JP 08-245810 are withdrawn for the same reasons set forth in the paragraph no. 1.
3. Withdrawal of the art rejections based on Tsang in the 05/20/2006 Office Action is improper because Tsang does teach an article comprising from about 60 vol% to 95 vol% of the polymeric matrix (see rejections below).

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 7, 11, 19, 22, 23 and 25-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsang et al (US 4,605,595). Tsang discloses a friction pad comprising an open foam structure of aluminum impregnated with a slurry of an epoxy resin binder and inorganic fillers and/or friction modifiers (column 4, lines 5-17). The claims do not preclude the polymeric matrix from having inorganic fillers, the slurry itself reads on Applicant's polymeric matrix. Tsang discloses the aluminum foam having 93 to 95% open cell structure. Likewise, the friction pad would substantially comprise about 93 to 95 vol% of the slurry so as to completely fill

the open cell foam with the slurry. The open cell foam is in the form of a sheet.

Accordingly, Tsang anticipates the claimed subject matter.

Tsang discloses the liquid binder present in the range of from 30 to 40 wt%. Likewise, the epoxy resin is occupied from 40 to 53 vol% of the composite material as the density of the epoxy resin is 0.75 as shown in the article entitled "Specific Gravity of Major Polymers", 1997. It is suggested that "the article comprising from about 60 to 95 vol% of a polymeric matrix which consists of a polymeric resin" would be sufficient to exclude Tsang as the prior art.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 17, 18, 20, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsang (US 4,605,595). Tsang does not specifically disclose the pore size distribution. However, it is known in the art that the pore size distribution directly effects the foam properties. Therefore, it would have been within the level of ordinary skill in the art to have used a uniform pore sized foam, motivated by the desire to obtain a foam having substantially uniform properties along the entire length of the foam. Likewise, it would have been obvious to the skilled artisan to use

a foam with gradation of pore sizes, motivated by the desire to obtain a foam with properties that vary along its length.

Tsang does not specifically disclose the composite article containing a plurality of impregnated metal foam sheets. However, the skilled artisan would have found it obvious to form a laminate containing a plurality of like impregnated metal foam sheets motivated by the desire to further enhance the properties exhibited by the use of one impregnated metal foam sheet.

Tsang does not specifically disclose the thickness of the metal foam being no less than 3 times the average diameter of the cells. However, such a variable would have been recognized by one skilled in the art as to enhance the compressive and tensile strength of the metal foam. Alternatively, it would have been obvious to the skilled artisan to prepare a metal foam having a smaller average cell diameter, motivated by the desire to have optimized the compressive, flexural, shear and tensile strength of the resulting impregnated foam. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized either the thickness of the metal foam or the average cell diameter of the metal foam motivated by the desire to enhance the tensile strength and barrier properties of the metal foam since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

8. Claims 1-4, 7, 11 and 17-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al (US 5,516,592) in view of Akiyama et al (US 4,713,277). Yang discloses a foamed aluminum alloy composite plate comprising an open foam structure of aluminum impregnated with a polymeric composition that contains an epoxy resin, an inorganic powder and a curing agent (example 1). The aluminum foam has a specific density from 0.47 to 0.53 (claim 7). The claims do not preclude the polymeric matrix from having inorganic fillers, the polymeric composition itself reads on Applicant's polymeric matrix. Yang does not specifically disclose a porosity of the aluminum foam. Akiyama, however, teaches the aluminum foam having a specific density of from 0.2 to 0.8 and a porosity of 90% (abstract, column 4, lines 5-7). The aluminum foam is lightweight and exhibits excellent sound absorbing property. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the aluminum foam having a porosity of 90% as taught by Akiyama from a practical view of lightweight and excellent sound absorbing property. Likewise, the resulting foamed aluminum alloy composite plate would substantially comprise about 90 vol% of the reinforcing composition, which is within the claimed range. Additionally, the composite plate contains from 35 wt% to 45 wt% of epoxy resin and epoxy resin has a specific gravity from 0.75 to 1.00 as shown in the article entitled "Specific Gravity of Major Polymers", 1997, which gives the epoxy resin occupying up to 60 vol% (45/0.75x100%).

Yang does not specifically disclose the pore size distribution. However, it is known in the art that the pore size distribution directly affects the foam properties. Therefore, it would have been within the level of ordinary skill in the art to have used a uniform pore sized foam, motivated by the desire to obtain a foam having substantially uniform properties along the entire length of the foam. Likewise, it would have been obvious to the skilled artisan to use a foam with gradation of pore sizes, motivated by the desire to obtain a foam with properties that vary along its length.

Yang does not specifically disclose the composite article containing a plurality of impregnated metal foam sheets. However, the skilled artisan would have found it obvious to form a laminate containing a plurality of like impregnated metal foam sheets motivated by the desire to further enhance the properties exhibited by the use of one impregnated metal foam sheet.

Yang does not specifically discloses the thickness of the metal foam being no less than 3 times the average diameter of the cells. However, such a variable would have been recognized by one skilled in the art as to enhance the compressive and tensile strength of the metal foam. Alternatively, it would have been obvious to the skilled artisan to prepare a metal foam having a smaller average cell diameter, motivated by the desire to have optimized the compressive, flexural, shear and tensile strength of the resulting impregnated foam. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized either the thickness of the

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metal foam or the average cell diameter of the metal foam motivated by the desire to enhance the tensile strength and barrier properties of the metal foam since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hai Vo

HV

**HAIVO  
PRIMARY EXAMINER**